



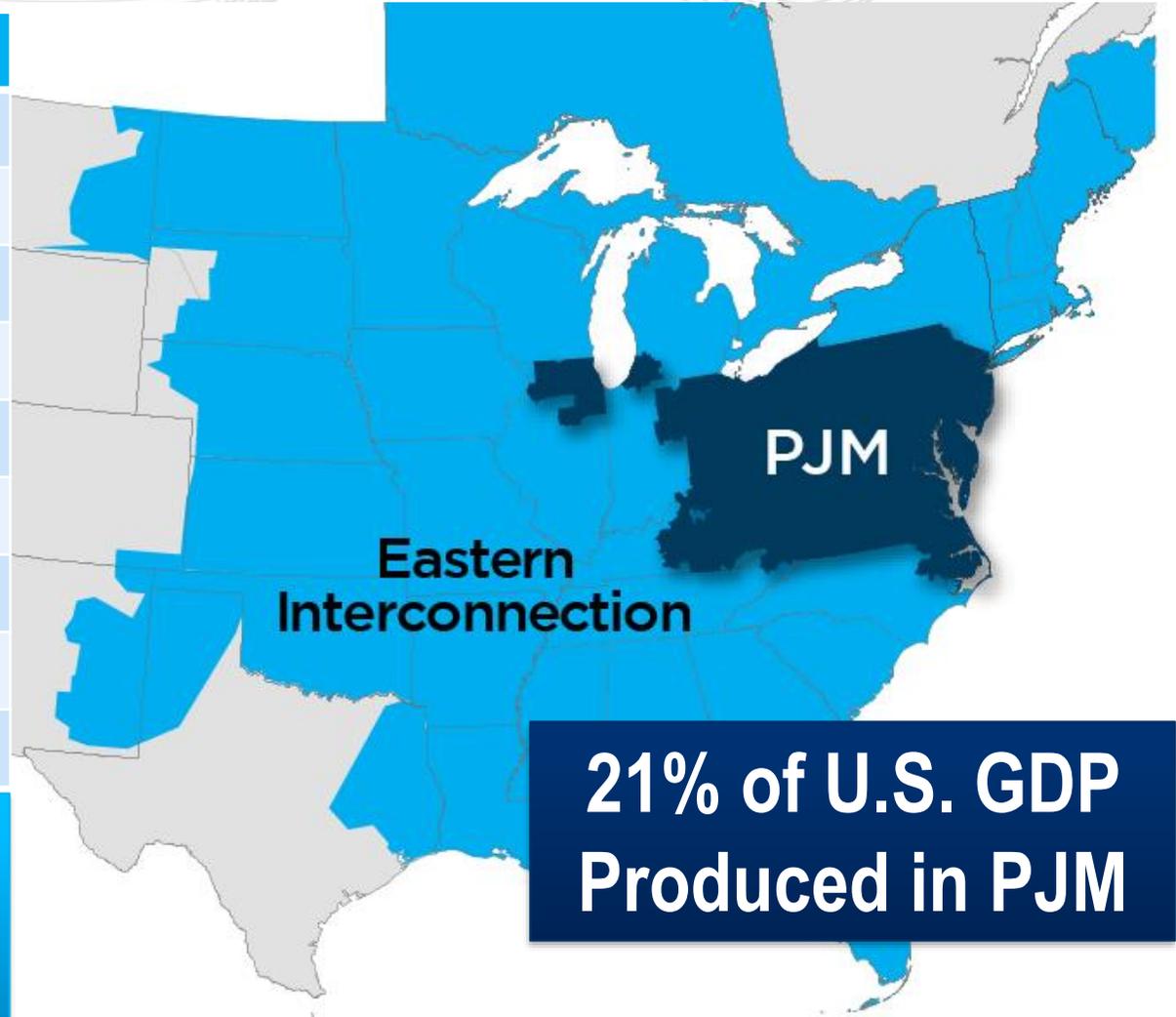
Summer 2023 PJM Reliability Assessment

Indiana Utility Regulatory Commission
May 3, 2023

Key Statistics

Member companies	1,110+
Millions of people served	65+
Peak load in megawatts	165,563
Megawatts of generating capacity	183,254
Miles of transmission lines	88,115
Gigawatt hours of annual energy	795
Generation sources	1,419
Square miles of territory	368,906
States served	13 + DC

- 26% of generation in Eastern Interconnection
- 25% of load in Eastern Interconnection
- 20% of transmission assets in Eastern Interconnection



As of 2/2023

Existing Capacity:

Total installed capacity in the Indiana service territory:

Coal
53.6%

Natural Gas
33.8%

In the region PJM serves, natural gas is 46.6% of total installed capacity, while coal represents 24%.

New Interconnection Requests in Indiana (nameplate):

Solar: 73.2%

Storage: 17.7%

Deactivations:

0 MW in Indiana gave notification of deactivation to PJM in 2022.

RTEP 2022:

IN's 2022 RTEP project total represents \$234.86 million in investment.

Load Forecast:

Summer peak load is projected to increase by 0.1% annually over the next 10 years in the Indiana portion of the AEP zone.

PJM RTO projected load growth rate is **0.8%**.

2023/2024 Resource Adequacy:

Indiana procures its capacity in PJM through the Fixed Resource Requirement (FRR) Alternative.

2022 Zonal Net Imports/Exports:

The Indiana portion of AEP was a net exporting region throughout most of the year.

Emissions:

Indiana's average CO₂ emissions slightly increased in 2022 compared to 2021 levels.

Indiana – Net Energy Import/Export Trend

(Jan. 2022 – Dec. 2022)



This chart reflects the portion of Indiana that PJM operates. Positive values represent exports and negative values represent imports.

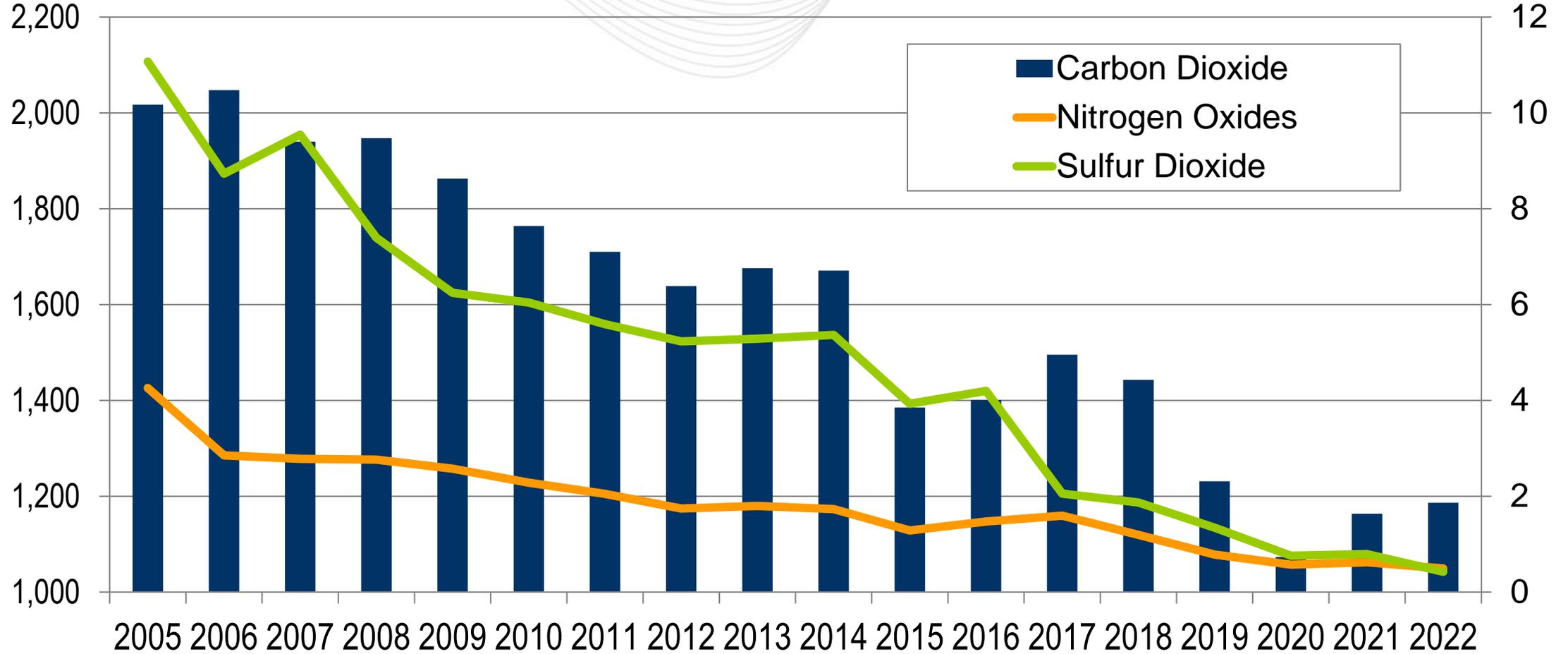


Indiana – Average Emissions (lbs/MWh)

(March 2023)

CO₂
(lbs/MWh)

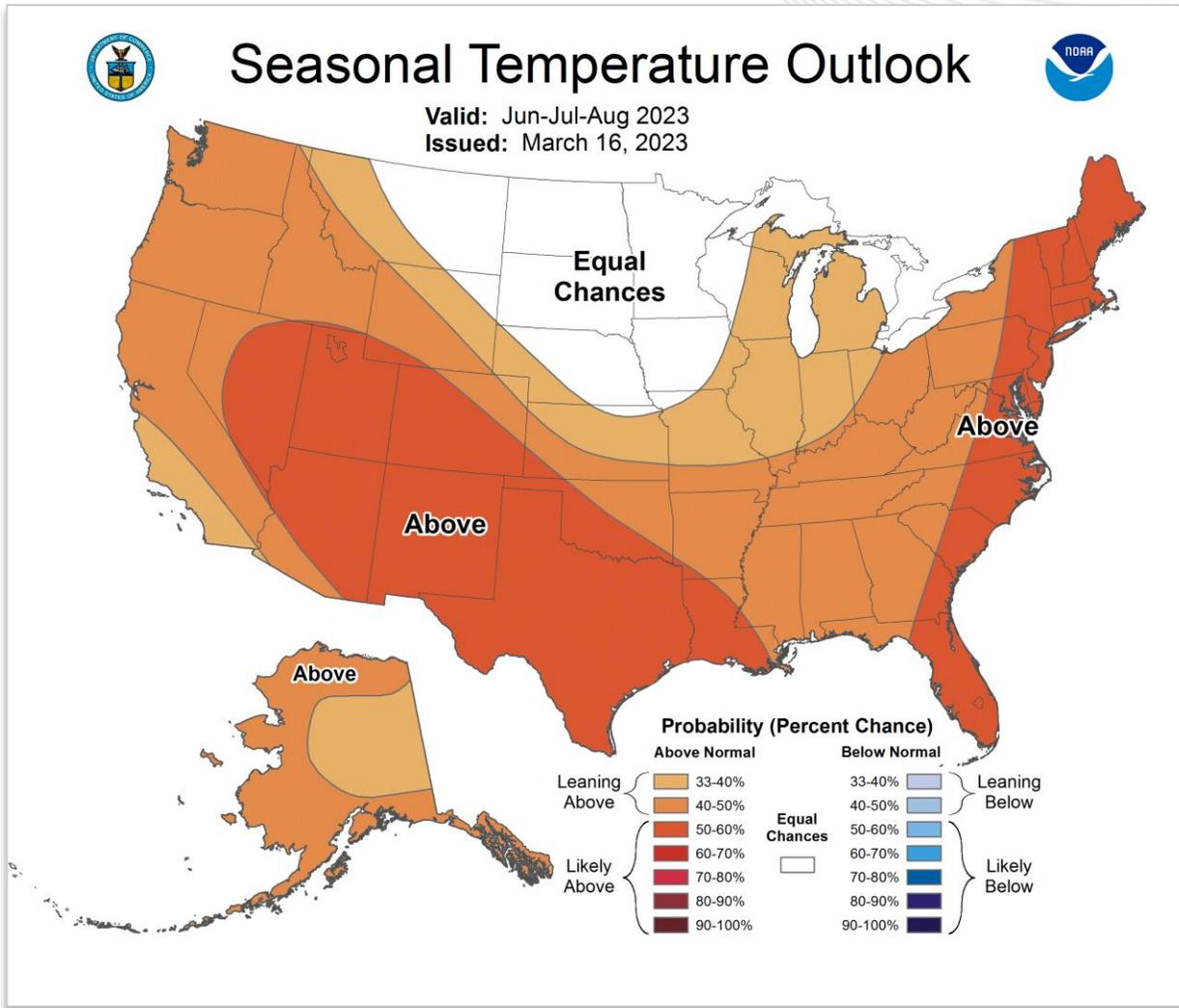
SO₂ and NO_x
(lbs/MWh)





PJM

2023 Operations Summer Assessment



Nationally, temperatures are likely to be above the 30-year normal.

Forecast influenced by warm ocean waters indicative of recent warm summers the past 10 years.

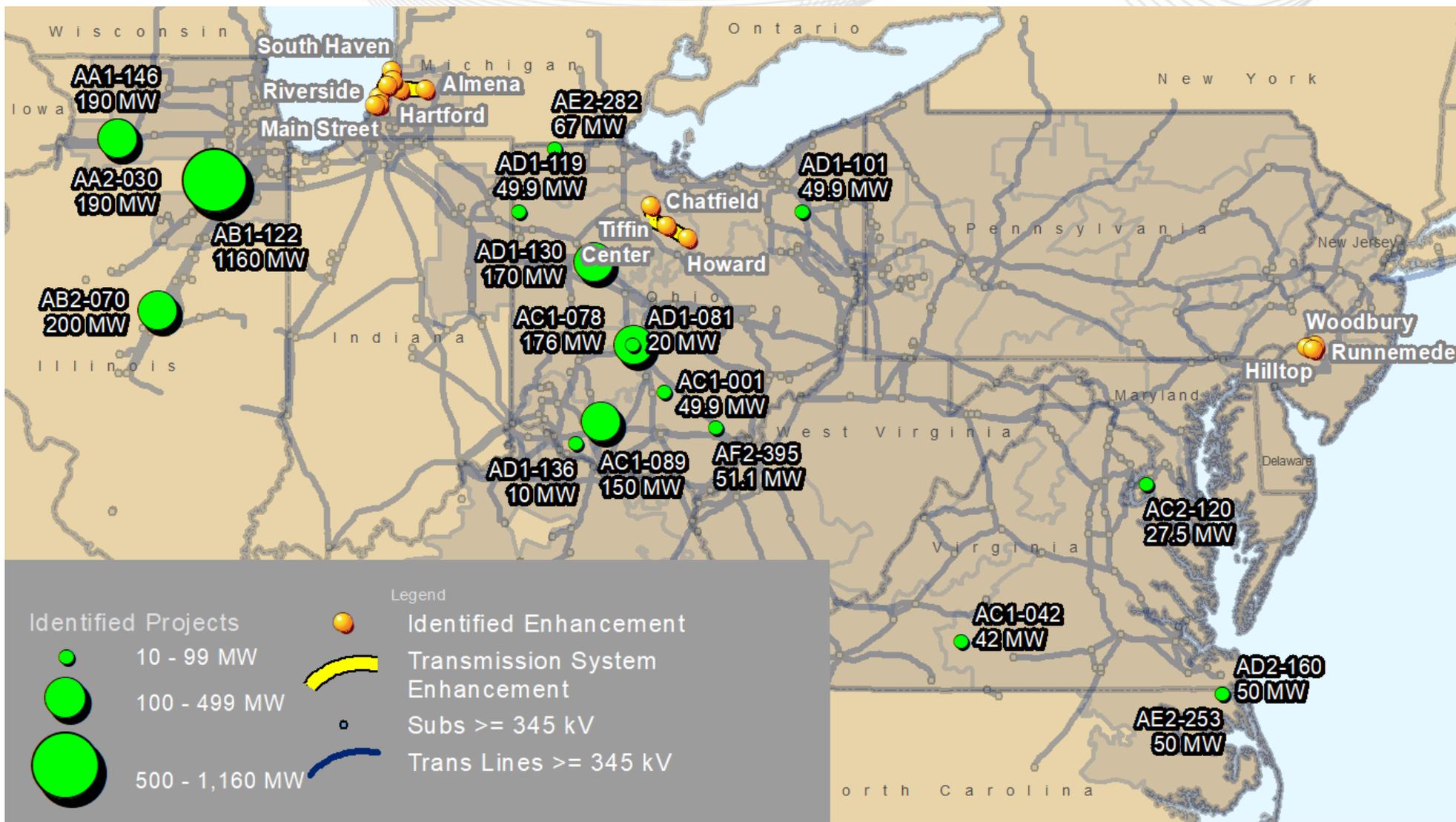
Five of the Top 10 hottest summers have occurred in the last decade.

Warm risk in central U.S. under drought conditions and cool risk in southeast U.S. with increasing wetness

Increased moisture may lead to warmer-than-normal overnight lows in eastern U.S.

Summer 2023 	DEMAND			PJM Installed Capacity ~ 187,000 MW
	Forecast Summer ~149,000 MW	Summer Study Average ~156,000 MW	Summer Study High ~163,000 MW	

Relative Peaks 	2022 Summer Peak (July 20) ~147,000 MW	All-Time Summer Peak (2006) 165,563 MW
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- No reliability issues identified for base case and N-1 analysis.
- Redispatch and switching required to control local thermal or voltage violations in some areas.
- All networked transmission voltage violations were controlled by shunt and tap adjustments.

Sensitivity Studies	Impact
<ul style="list-style-type: none"> External Contingencies 	No reliability concerns
<ul style="list-style-type: none"> N-1-1 Relay Trip Conditions 	No cascading outage concerns identified <i>All networked transmission overloads were controlled pre-contingency.</i>
<ul style="list-style-type: none"> Max-Cred Contingency Analysis 	No reliability concerns
<ul style="list-style-type: none"> Transfer Interface Analysis 	No reliability concerns
<ul style="list-style-type: none"> 90/10 Load Forecast Study (162,666 MW) 	No reliability concerns
<ul style="list-style-type: none"> Solar and Wind Generation Sensitivity Study 	No reliability concerns

Perform a summer reliability assessment to include any additional sensitivity analysis required.

Coordinate summer assessments with neighboring systems (NYISO, MISO, TVA and VACAR).

Conduct emergency procedures drill to prepare PJM staff and PJM stakeholder staff for any emergency operations.

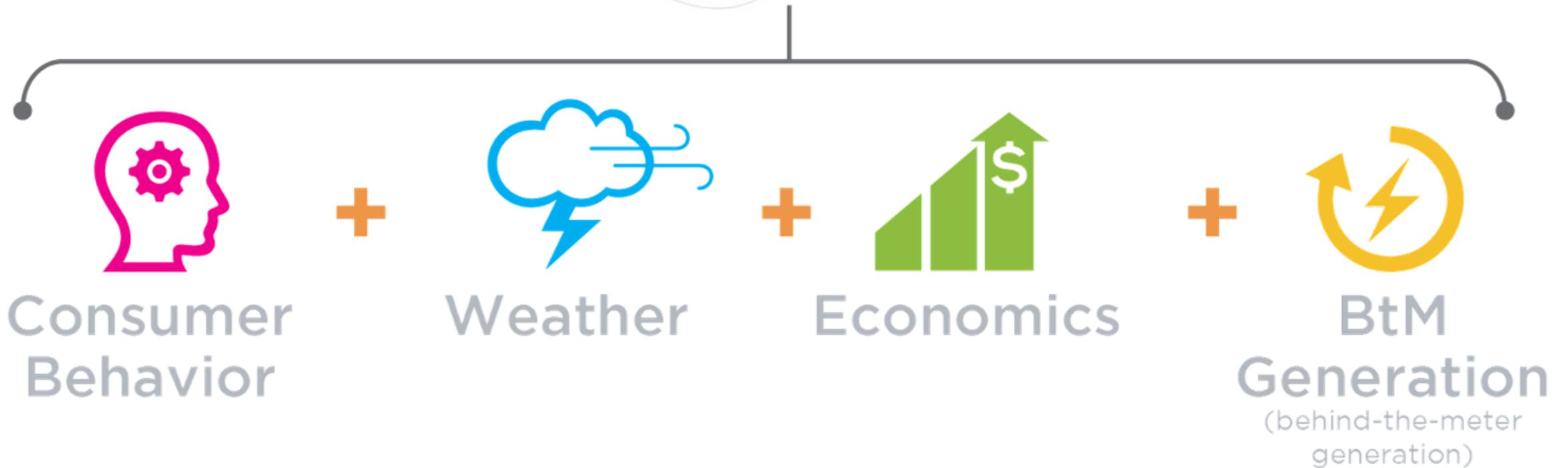
Request generator fuel inventory and supply data to maintain situational awareness throughout the spring and summer as necessary.

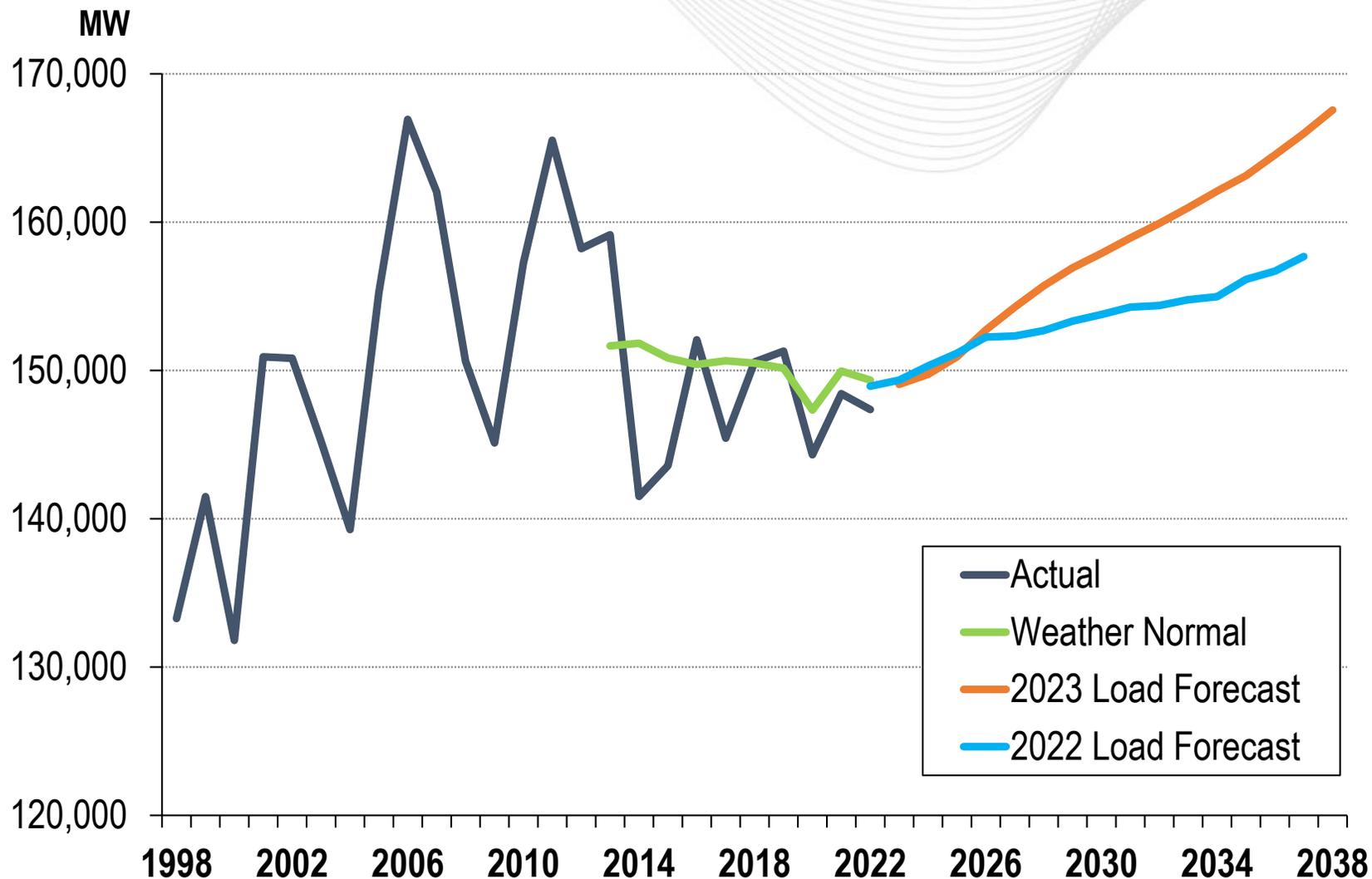


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Load Forecasts

LOAD FORECAST





15-Year Annualized Growth Rate

Load Growth

2022

0.4%

2023

0.8%

Select Year Comparisons

Load Forecast:
2023 vs. 2022

2025

0.2%

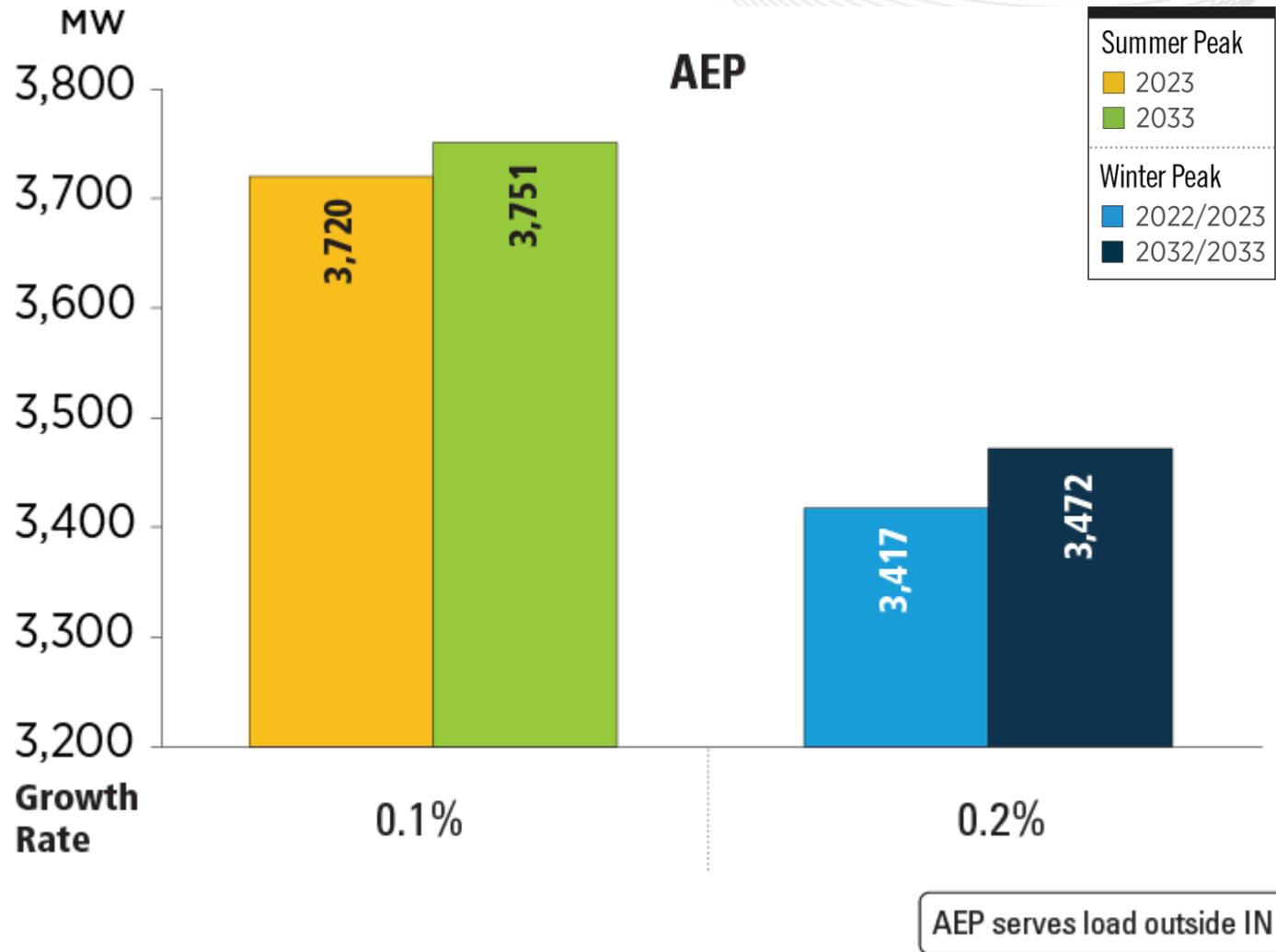
2027

1.3%

2037

5.3%





PJM RTO Summer Peak		PJM RTO Winter Peak	
2023	2033	2022/2023	2032/2033
149,059 MW	160,971 MW	130,811 MW	144,992 MW
Growth Rate 0.8%		Growth Rate 1.0%	

The summer and winter peak megawatt values reflect the estimated amount of forecast load to be served by each transmission owner in the noted state/district. Estimated amounts were calculated based on the average share of each transmission owner’s real-time summer and winter peak load in those areas over the past five years.

For More Information:

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PJM Summer Reliability Assessment



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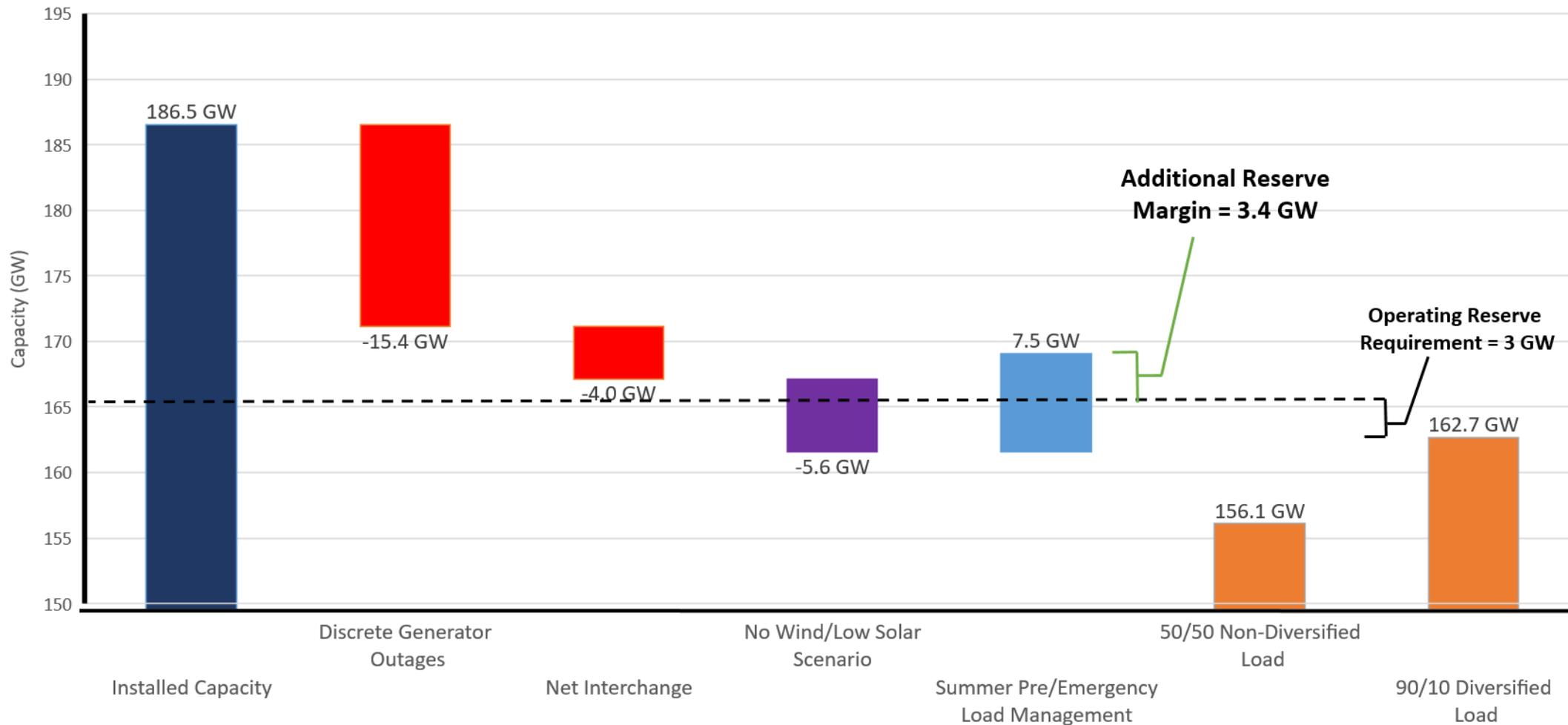


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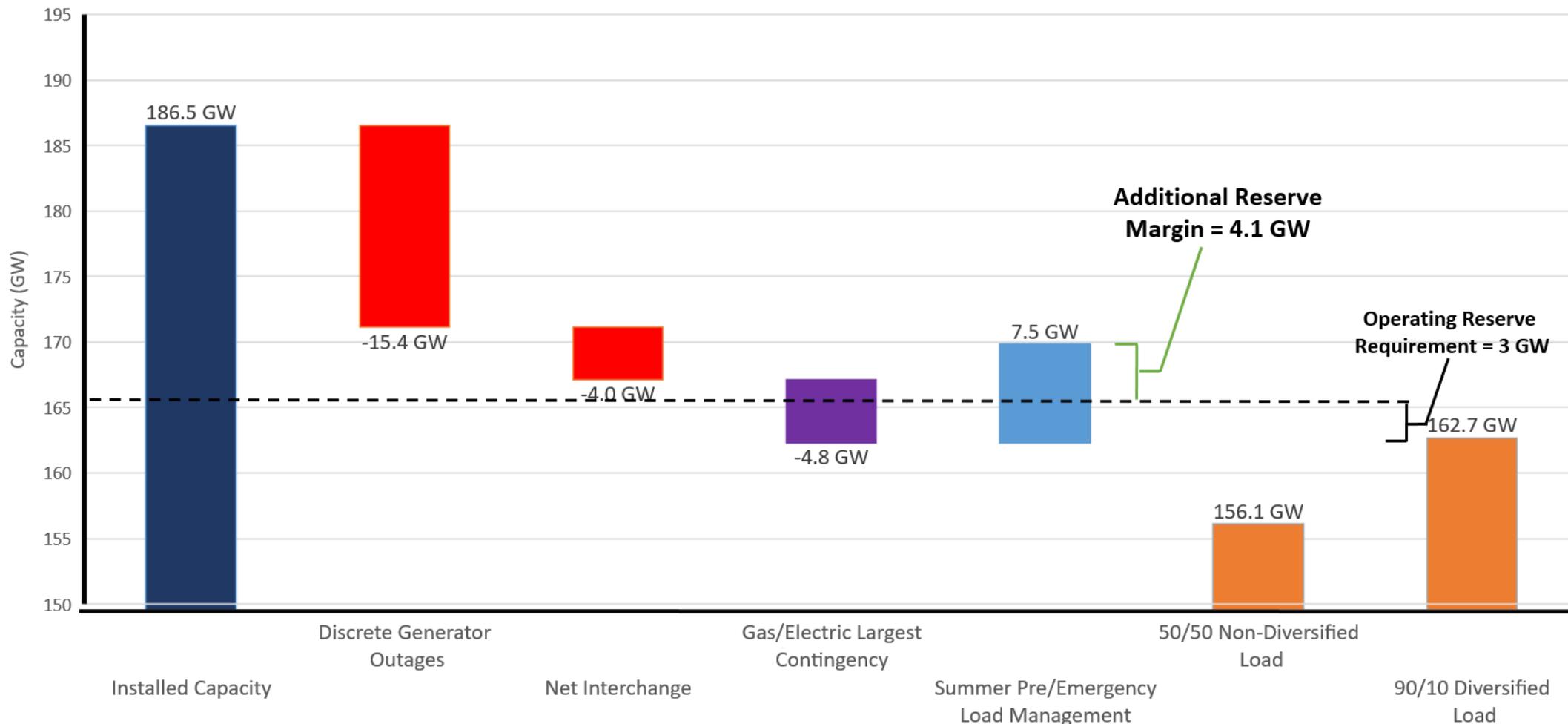
Additional Information

Capacity “Waterfall” Charts

Summer 2023 No Wind and Low Solar Scenario Overview (Preliminary)

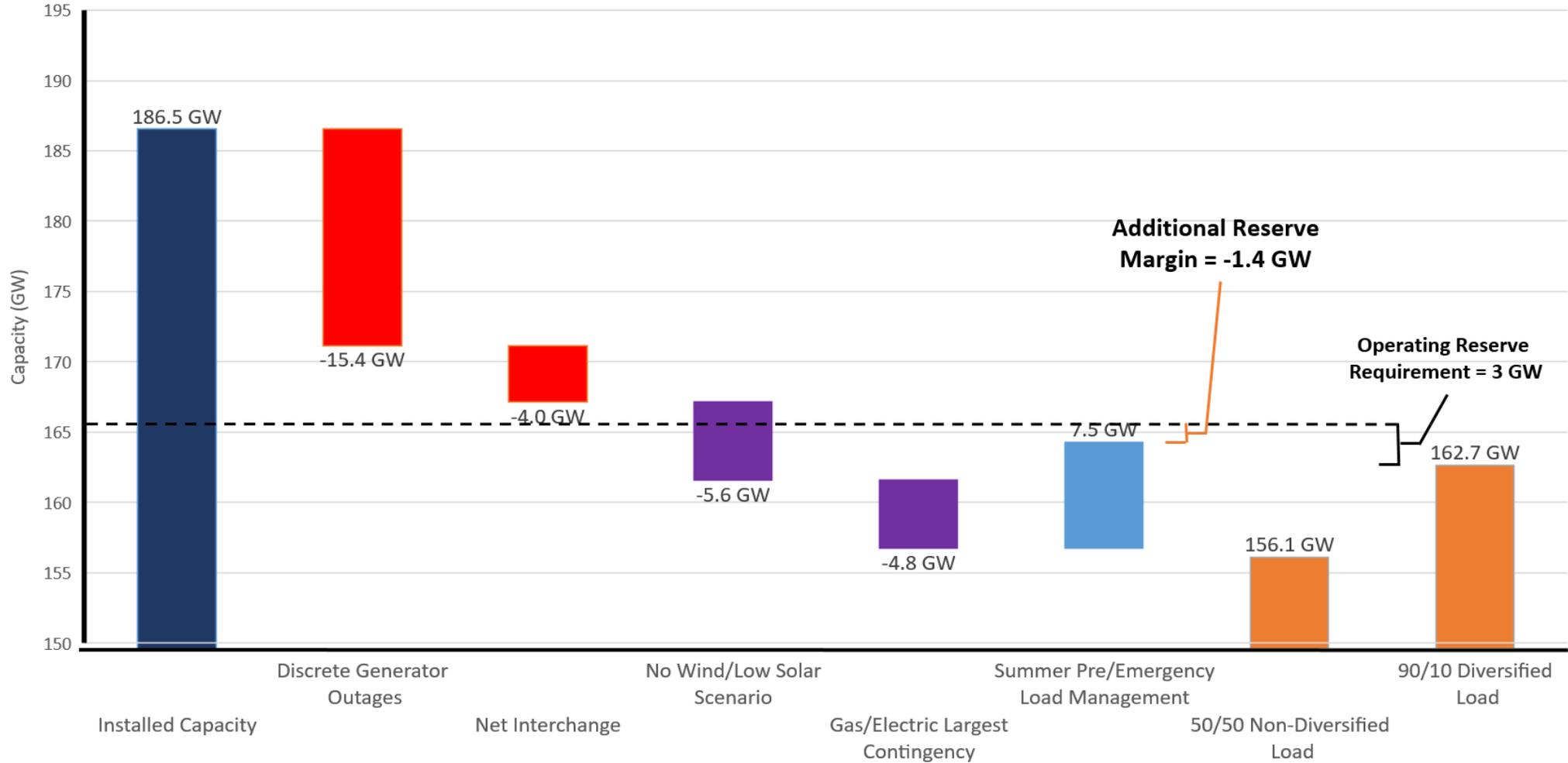


Summer 2023 Gas Electric Contingency Scenario Overview (Preliminary)



Summer 2023 Preliminary Capacity Projections

Summer 2023 Extreme Scenario Overview (Preliminary)

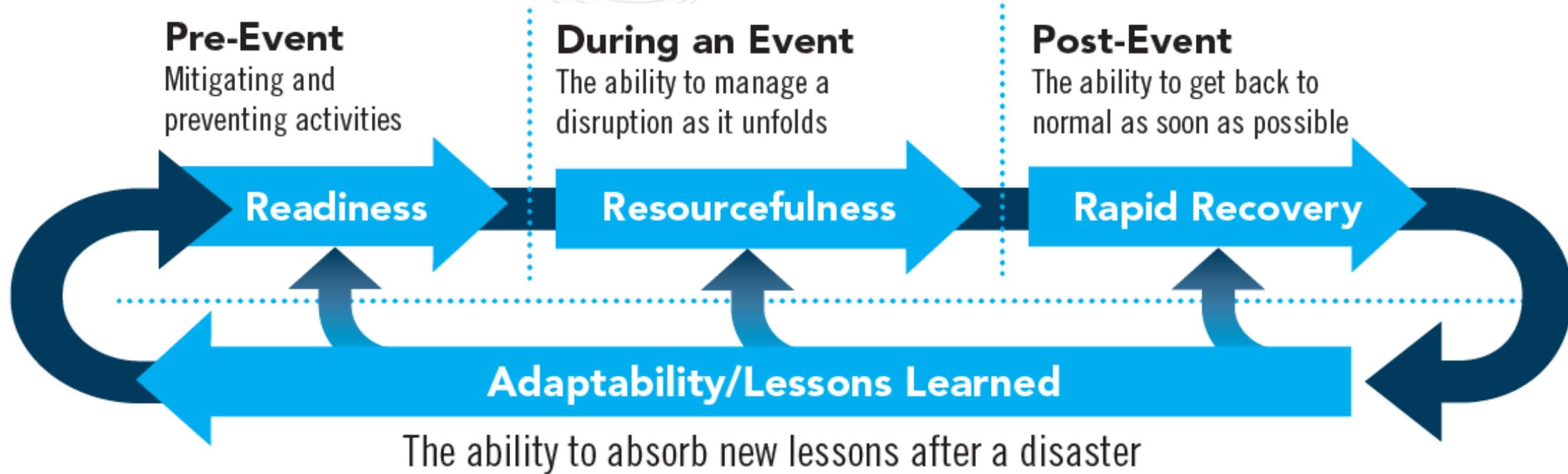


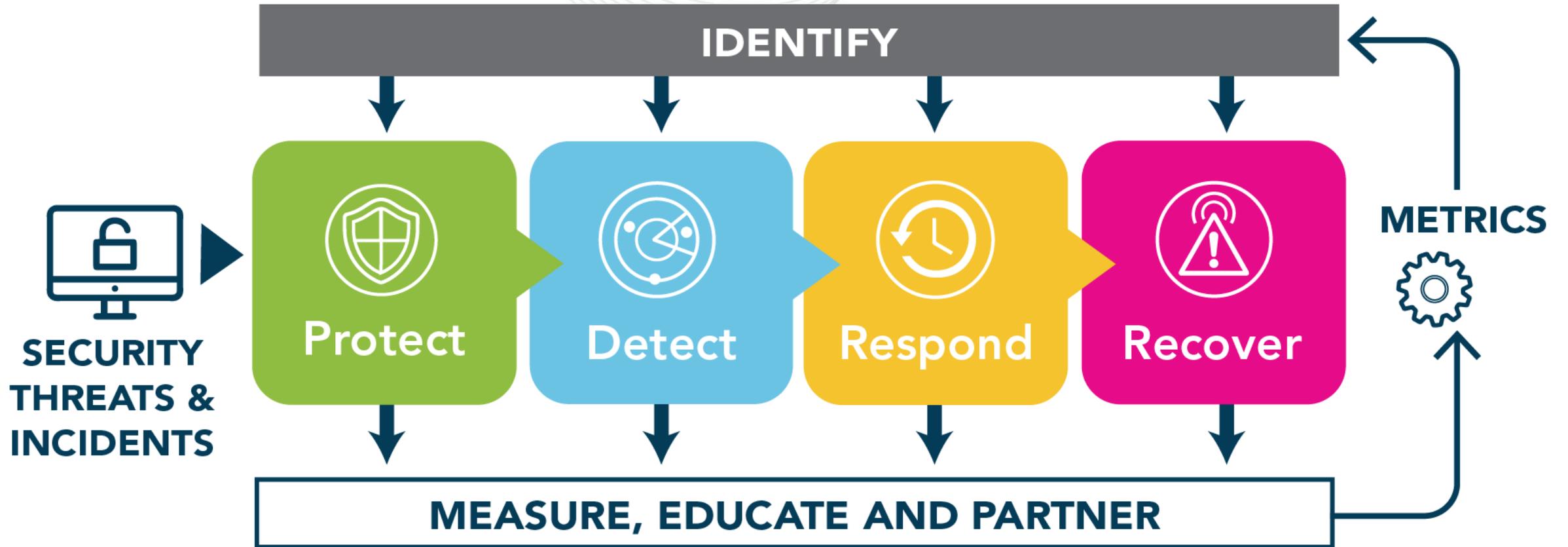


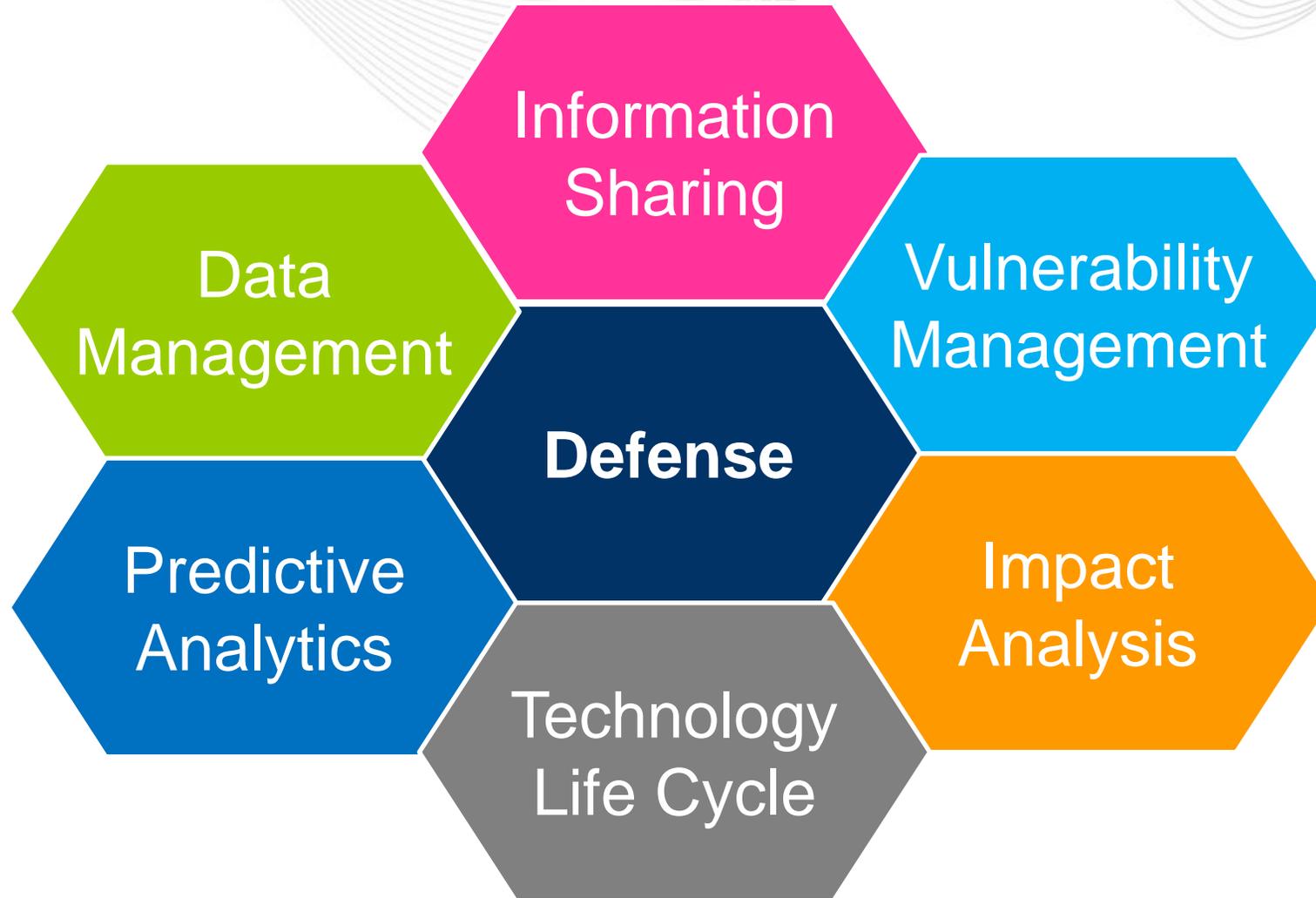
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Resilience and Cybersecurity

Incident Focused
Incident-Driven
Learning







Prevention

- Build security into the design.
- Implement traditional controls.
- Improve security controls.



Resilience

- Focus on incident response.
- Enhance scenario planning.
- Plan and drill restoration scenarios.

Collaboration

- Coordinate response plans.
- Develop and maintain government relationships.
- Leverage industry relationships.
- Share best practices.

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